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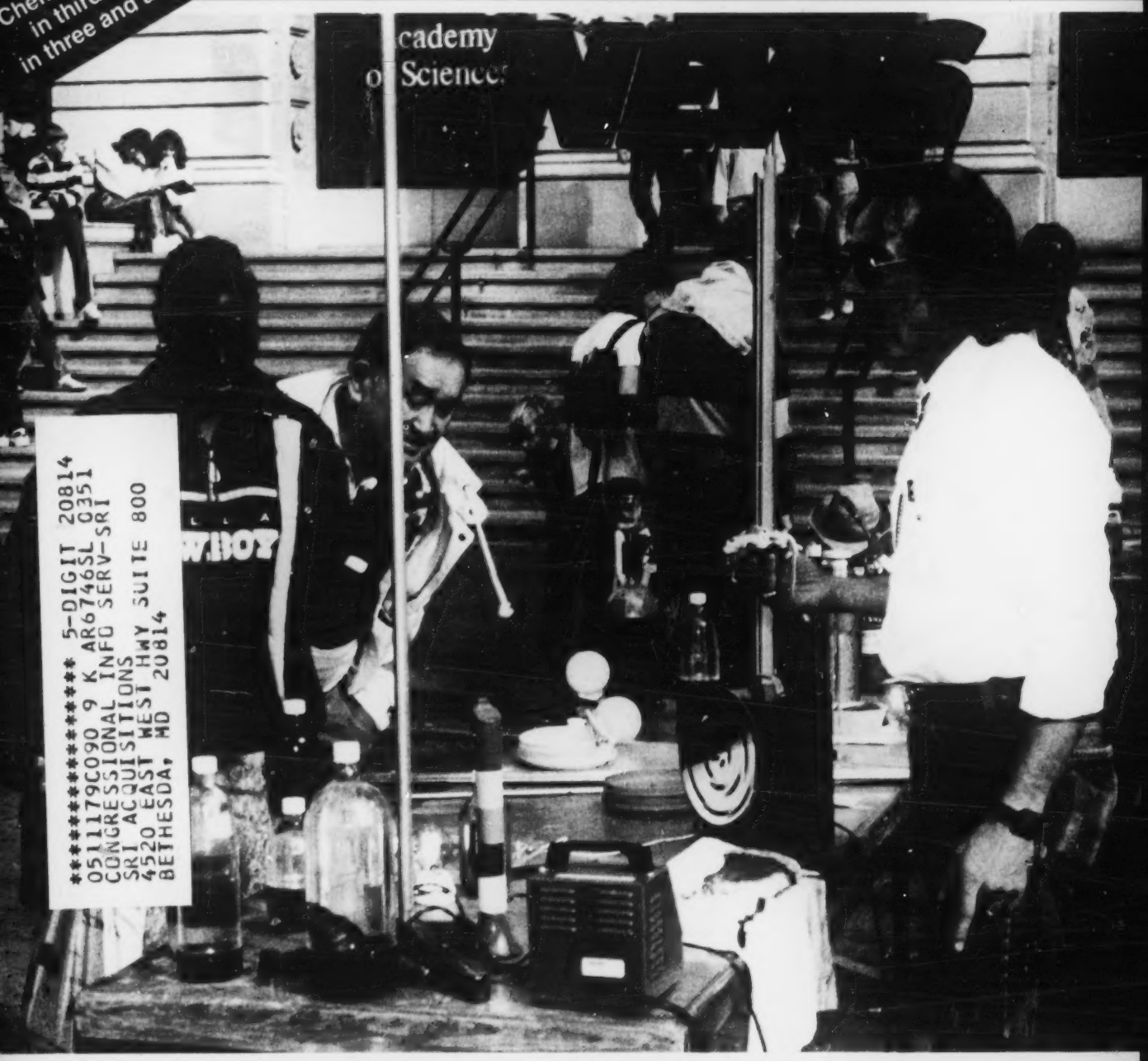
NOVEMBER 13, 1989
CHEMICAL & ENGINEERING

Chemical company earnings fall in third quarter; first decline in three and a half years Page 8

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# National Chemistry Week

**Variety of activities aims to improve public understanding of chemistry** Page 26

CHEMICAL & ENGINEERING
NEWS
Volume 67, Number 46
CENEAR 67 (46) 1–56
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NOVEMBER 13, 1989

## News of the Week

■ **OSHA to tighten regulation of chemical plants, in wake of explosion and fire at Phillips 66 polyethylene complex in Pasadena, Tex.** **Page 4**

■ **Debate sharpens over how to deal with radioactive waste accumulating at U.S. nuclear power plants.** **Page 5**

■ **Chemical executives attending CMA's annual conference last week in Washington, D.C., expect benefits for their firms from EC-92.** **Page 5**

■ **A. H. Robins' Dalkon Shield case, one of the largest product liability cases, is finally nearing an end.** **Page 6**

■ **New instrumentation being developed by Applied Biosystems may speed the human genome project.** **Page 6**

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*Cover:* National Chemistry Week display outside Chicago Academy of Sciences. Photo by C&EN's Ward Worthy

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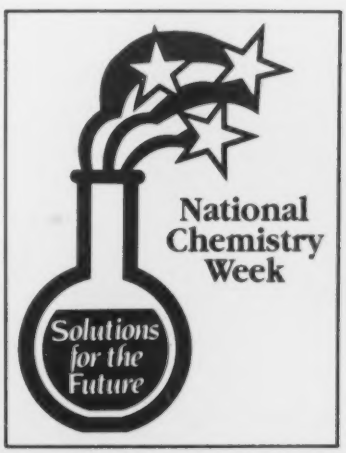


## Cover Story

**ACS's National Chemistry Week, aimed at impressing on the public and particularly on the young chemistry's essential role, was marked by hundreds of projects in locations across the nation.** **Page 26**

**Chemical & Engineering News**
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# LETTERS

## CHEMICAL SAFETY

### Formic acid explosion

SIR: A storeman recently lost an eye when an E. Merck of Darmstadt, West Germany, 1-L bottle of 98 to 100% formic acid exploded as he lifted it off the shelf in the main store of this chemistry school. He was not wearing safety glasses. Concentrated formic acid slowly decomposes to carbon monoxide and water upon prolonged storage, and the gas pressure can be sufficient to rupture sealed glass containers. It happens that none of the academic or technical staff members of the school were aware of this hazard. The first descriptions in the general safety literature appear to have been in the second edition of L. Bretherick's "Handbook of Reactive Chemical Hazards" [Butterworths, London, page 298 (1979)] and the third edition of "Hazards in the Chemical Laboratory" [Royal Society of Chemistry, page 339 (1981)].

Merck recognized the problem some years ago, and in 1984 changed the ordinary white screw cap to a black cap incorporating a degassing valve. The significance of the change was, however, not widely communicated to their customers in this region. The bottle that exploded here was the old type with a white cap. The purpose of this note is to advise chemists to check their stocks of 98 to 100% formic acid. Any bottle from Merck or other suppliers that does not have a pressure relief valve in the cap should be made safe by gently unscrewing the cap. This should be done only while wearing a face shield, goggles, and heavy-duty gloves and overalls, with another person standing by in the event of an explosion. Such old stock should also be used soon. Our experience reinforces the desirability of wearing safety glasses whenever chemicals are being handled.

**A. V. Robertson**
*School of Chemistry*
*University of Sydney, Australia*

*Editor's note:* E. Merck of Darmstadt, West Germany, is not affiliated with Merck, Rahway, N.J., which does not supply reagent chemicals, including formic acid.

### Upgrading science

SIR: Education in the physical/biological sciences and mathematics sectors can be easily (but with some bloodletting) upgraded at the precollege level as follows.

Eliminate tenure completely and adopt objective methods of performance review used in industry to weed out the deadwood and reward and attract solid professional talent to primary and secondary school education. Industry no longer has any guarantee of permanent professional employment. This died in the early 1960s. If you can't produce, out you go—no more good-old-boy system to protect you.

Start attracting enthusiastic, talented people by paying competitive salaries. If this requires a surtax at the state level, so be it. The time for hand-wringing and bemoaning poor quality technical education must come to an end now! Let's get our best industrial people together into a task force and get the mechanisms into place that will start the upgrading of our nation's science and math programs within the next year.

**Seymour Broad**
*Cincinnati*

### Space exploration benefits

SIR: I read with utter disbelief the letter of Robert Kofahl (C&EN, Sept. 4, page 69) regarding the "uselessness" of space exploration. Such a contemptuous opinion from a layperson would not be as surprising, but from a presumably scientifically trained person, it is inexcusable.

That "hoisting people to the moon" in silly "escapades" has no military or economic value for the nation can be disproven in a multitude of discussions. Kofahl has obviously never taken a course in the history of science nor does he understand the nature of discovery. Many great discoveries and accomplishments result from striving for what we only think is impossible. Through the ages, people's curiosity and desire for knowledge have advanced us from the days of Galileo to the computer age. Develop the same technology by staying in "inner space"? The fact is that one does not stand up and say, "Let us discover the new realm of topography and meteorology to improve the world's food supply today"; or, "Gee, let's invent some new ceramics to withstand space conditions and temperatures of reentry to Earth's atmosphere"; or, "Let's dream up novel ways to use and alter computer technologies" (recent Voyager results being a case in point).

So many technologies could not have even been thought of without the perspective of space, or without the goal to strive for. Many thousands of scientists and engineers, tirelessly focused on a single grand goal, accomplished more in the moon mission than in any other

# Chemical Earnings Turn Down In Third Quarter

**William J. Storck,**
C&EN Northeast News Bureau

After three and a half years of solid growth in earnings, the chemical industry has finally turned down. The third-quarter results from chemical firms represent the first year-to-year decline in quarterly earnings since the fourth quarter of 1985. Combining to halt the increases were lower selling prices and declining demand for many petrochemical derivatives.

Oil earnings and chemical earnings at energy companies also fell, but earnings at diversified companies that produce chemicals and at pharmaceutical firms generally continued to increase.

In the second quarter, earnings from chemical companies ended their long string of double-digit increases. Still, they managed to post a modest gain. Now, however, earnings have sunk into a double-digit decline.

The slide in earnings has been caused at most companies by falling demand and prices. This is especially true at petrochemical operations, where the decrease in feedstock costs has not been taking place as rapidly as the decrease in selling prices of polymer products. For instance, Du Pont says that its polymers segment reported lower earnings in the third quarter, reflecting the impact of softening demand and lower selling prices on ethylene-based products for the packaging and industrial polymer markets.

And sales of Dow Chemical's plastics business slipped almost 1% for the quarter. Polyethylene prices, according to the company, were hit by summer inventory corrections and increased ethylene availability.

## Chemical industry leaders for the third quarter . . .

**Sales**

| Rank 1989 | | $ Millions | Rank 1988 |
|---|---|---|---|
| 1 | Dow Chemical | $4250.0 | 1 |
| 2 | Union Carbide | 2141.0 | 2 |
| 3 | Monsanto | 2061.0 | 3 |
| 4 | W. R. Grace | 1487.5 | 4 |
| 5 | American Cyanamid | 1140.8 | 5 |
| 6 | Hercules | 787.4 | 8 |
| 7 | Air Products | 668.6 | 9 |
| 8 | Arco Chemical | 632.0 | 7 |
| 9 | Rohm & Haas | 623.0 | 10 |
| 10 | Ethyl | 613.7 | 13 |

**Earnings[a]**

| | $ Millions | Rank 1988 |
|---|---|---|
| Dow Chemical | $589.0 | 1 |
| Union Carbide | 139.0 | 2 |
| Monsanto | 126.0 | 4 |
| Arco Chemical | 94.0 | 3 |
| American Cyanamid | 64.5 | 7 |
| Ethyl | 54.8 | 11 |
| Air Products | 51.0 | 9 |
| Georgia Gulf | 46.1 | 8 |
| Grace | 45.5 | 12 |
| B. F. Goodrich | 39.1 | 6 |

**Profitability**

| | Earnings as % of sales | Rank 1988 |
|---|---|---|
| Georgia Gulf | 18.3% | 2 |
| International Flavors | 15.8 | 5 |
| Arco Chemical | 14.9 | 3 |
| Dow Chemical | 13.9 | 6 |
| Great Lakes Chemical | 13.8 | 1 |
| Vista Chemical | 12.8 | 4 |
| Loctite | 12.6 | 10 |
| Nalco Chemical | 12.0 | 13 |
| Betz Laboratories | 11.3 | 11 |
| Aristech | 9.5 | 7 |

## . . . and for first nine months of 1989

**Sales**

| Rank 1989 | | $ Millions | Rank 1988 |
|---|---|---|---|
| 1 | Dow Chemical | $13,336.0 | 1 |
| 2 | Monsanto | 6,674.0 | 2 |
| 3 | Union Carbide | 6,659.0 | 3 |
| 4 | W. R. Grace | 4,395.4 | 4 |
| 5 | American Cyanamid | 3,671.7 | 5 |
| 6 | Hercules | 2,318.3 | 7 |
| 7 | Arco Chemical | 2,057.0 | 8 |
| 8 | Quantum Chemical | 2,044.3 | 6 |
| 9 | Rohm & Haas | 2,037.7 | 9 |
| 10 | Air Products | 2,001.3 | 10 |

**Earnings[a]**

| | $ Millions | Rank 1988 |
|---|---|---|
| Dow Chemical | $2060.0 | 1 |
| Monsanto | 589.0 | 2 |
| Union Carbide | 526.0 | 3 |
| Arco Chemical | 330.0 | 4 |
| American Cyanamid | 263.9 | 6 |
| Air Products | 161.0 | 9 |
| Ethyl | 156.9 | 10 |
| Rohm & Haas | 155.0 | 7 |
| Georgia Gulf | 150.7 | 11 |
| B. F. Goodrich | 143.1 | 8 |

**Profitability**

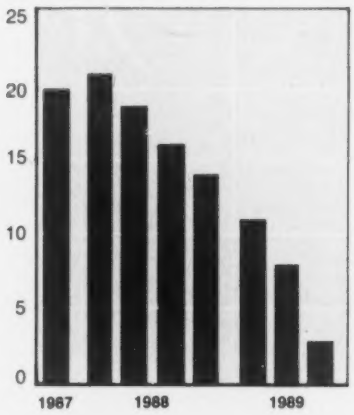
| | Earnings as % of sales | Rank 1988 |
|---|---|---|
| Georgia Gulf | 17.5% | 3 |
| International Flavors | 16.8 | 6 |
| Great Lakes Chemical | 16.2 | 2 |
| Arco Chemical | 16.0 | 1 |
| Dow Chemical | 15.4 | 7 |
| Vista Chemical | 15.1 | 4 |
| Loctite | 12.7 | 9 |
| Nalco Chemical | 11.1 | 11 |
| Betz Laboratories | 10.9 | 9 |
| Monsanto | 8.8 | 18 |
| Ethyl | 8.8 | 15 |

**Note:** Based on 30 chemical companies listed on page 10. a After taxes.

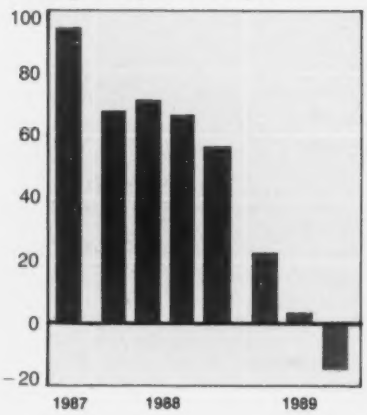
# Chemical industry 1989 third-quarter results

- **Sales increased 3%**
- **Earnings fell 15%**
- **Profit margins at 8.1%**
- **Production rose 4.9%**
- **Prices moved up 3.8%**

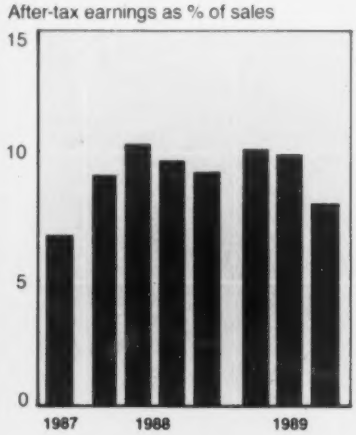
**Sales**
% change from year-earlier quarter



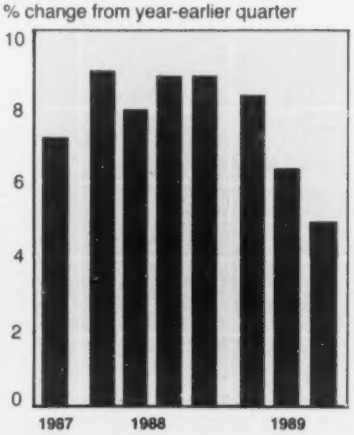

**Earnings**
% change from year-earlier quarter



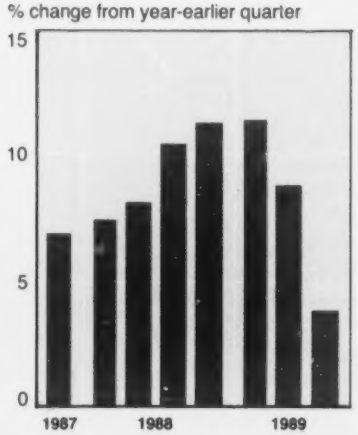

**Profit margins**
After-tax earnings as % of sales




**Production**
% change from year-earlier quarter

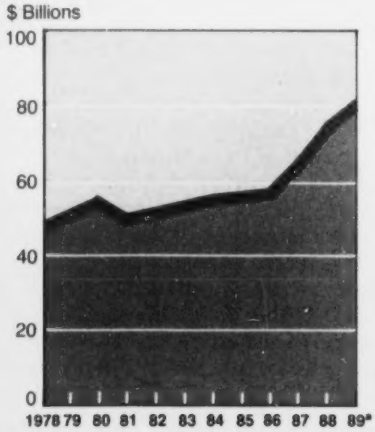



**Prices**
% change from year-earlier quarter

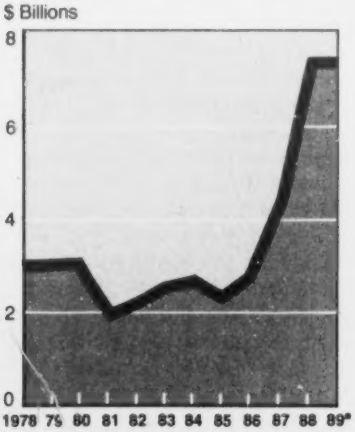



## Sales in 1989 will rise about 6% while earnings will be flat, lowering profit margins to about 9.2%

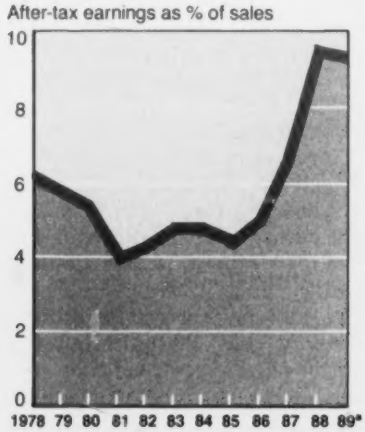
**Annual sales**
$ Billions




**Annual earnings**
$ Billions




**Annual profit margins**
After-tax earnings as % of sales




**Note:** All sales, earnings, and profit margin data are based on combined results of 30 companies listed on page 10. a C&EN estimates.

## Chemical earnings fall 15% in third quarter on modest sales increase

| | THIRD-QUARTER 1989 | | | | | | NINE-MONTHS 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sales | Earnings[a] | Change from 1988 | | Profit margin[b] | | Sales | Earnings[a] | Change from 1988 | |
| | ($ millions) | | Sales | Earnings | 1989 | 1988 | ($ millions) | | Sales | Earnings |
| Air Products[c] | $ 668.6 | $ 51.0 | 7% | 1% | 7.6% | 8.1% | $ 2,001.3 | $ 161.0 | 8% | 2% |
| American Cyanamid[c] | 1,140.8 | 64.5 | 4 | 1 | 5.7 | 5.9 | 3,671.7 | 263.9 | 5 | 9 |
| Arco Chemical[c] | 632.0 | 94.0 | −9 | −25 | 14.9 | 18.1 | 2,057.0 | 330.0 | 5 | −8 |
| Aristech | 230.4 | 21.9 | −17 | −47 | 9.5 | 15.0 | 773.8 | 67.0 | −4 | −48 |
| Betz Laboratories | 133.4 | 15.1 | 16 | 18 | 11.3 | 11.1 | 388.2 | 42.4 | 17 | 18 |
| Cabot[c] | 445.4 | −5.1 | 11 | def | def | 1.0 | 1,456.9 | 33.5 | 13 | −14 |
| Chemed | 153.3 | 7.9 | 4 | 25 | 5.1 | 4.3 | 446.2 | 20.4 | 26 | 21 |
| Crompton & Knowles | 87.9 | 5.8 | 10 | 47 | 6.6 | 4.9 | 270.7 | 18.5 | 33 | 46 |
| Dow Chemical[c] | 4,250.0 | 589.0 | 2 | −7 | 13.9 | 15.2 | 13,336.0 | 2060.0 | 8 | 16 |
| Ethyl[c] | 613.7 | 54.8 | 18 | 19 | 8.9 | 8.8 | 1,790.0 | 156.9 | 18 | 12 |
| First Mississippi | 102.5 | 0.9 | 25 | −80 | 0.9 | 5.5 | 357.7 | 6.9 | 52 | −62 |
| H. B. Fuller | 189.9 | 3.8 | 7 | −35 | 2.0 | 3.3 | 563.8 | 10.6 | 12 | −35 |
| Georgia Gulf | 251.2 | 46.1 | −10 | −13 | 18.3 | 19.0 | 861.3 | 150.7 | 11 | 8 |
| B. F. Goodrich[c] | 601.3 | 39.1 | −3 | −43 | 6.5 | 11.1 | 1,846.0 | 143.1 | 7 | −13 |
| W. R. Grace[c] | 1,487.5 | 45.5 | 7 | 1 | 3.1 | 3.3 | 4,395.4 | 120.4 | 6 | −8 |
| Great Lakes Chemical | 228.7 | 31.7 | 65 | 18 | 13.8 | 19.3 | 566.1 | 91.5 | 36 | 21 |
| Hercules[c] | 787.4 | 30.5 | 15 | −5 | 3.9 | 4.7 | 2,318.3 | 108.3 | 13 | 0 |
| International Flavors | 216.9 | 34.2 | 8 | 11 | 15.8 | 15.4 | 680.9 | 114.2 | 3 | 8 |
| International Minerals | 311.4 | 7.5 | 43 | −34 | 2.4 | 5.2 | 835.7 | 59.9 | 18 | −6 |
| Loctite | 114.9 | 14.4 | 8 | 21 | 12.6 | 11.2 | 352.2 | 44.7 | 8 | 26 |
| Lubrizol | 274.7 | 21.4 | 3 | −37 | 7.8 | 12.8 | 947.3 | 78.1 | 12 | −2 |
| Monsanto[c] | 2,061.0 | 126.0 | 2 | 7 | 6.1 | 5.8 | 6,674.0 | 589.0 | 4 | 8 |
| Nalco Chemical | 270.0 | 32.5 | 9 | 21 | 12.0 | 10.8 | 787.6 | 87.3 | 8 | 12 |
| Olin[c] | 580.0 | 24.0 | 7 | 26 | 4.1 | 3.5 | 1,909.0 | 93.0 | 13 | 21 |
| Petrolite | 71.9 | 3.3 | 0 | 31 | 4.6 | 3.5 | 216.2 | 8.6 | −4 | −21 |
| Quantum Chemical[c] | 557.7 | 20.3 | −23 | −79 | 3.6 | 13.1 | 2,044.3 | 137.7 | −3 | −49 |
| Rohm & Haas[c] | 623.0 | 32.6 | 1 | −35 | 5.2 | 8.0 | 2,037.7 | 155.0 | 5 | −17 |
| Union Carbide[c] | 2,141.0 | 139.0 | 2 | −35 | 6.5 | 10.1 | 6,659.0 | 526.0 | 8 | 5 |
| Vista Chemical | 186.9 | 23.8 | −5 | −28 | 12.8 | 16.8 | 587.7 | 88.7 | −2 | −11 |
| Witco[c] | 395.0 | 20.5 | −2 | 2 | 5.2 | 5.0 | 1,208.0 | 64.0 | 1 | 2 |
| **Total 15 larger companies** | **$16,984.5** | **$1325.7** | **2%** | **−16%** | **7.8%** | **9.5%** | **$53,404.5** | **$4941.8** | **7%** | **4%** |
| **Total 15 smaller companies** | **$ 2,824.0** | **$ 270.2** | **8%** | **−11%** | **9.6%** | **11.7%** | **$ 8,635.4** | **$ 889.5** | **12%** | **−3%** |
| **GRAND TOTAL** | **$19,808.5** | **$1595.9** | **3%** | **−15%** | **8.1%** | **9.8%** | **$62,039.9** | **$5831.3** | **8%** | **3%** |

a After-tax earnings from continuing operations, excluding significant extraordinary and nonrecurring items. b After-tax earnings as a percentage of sales. c One of the 15 largest companies. def = deficit.

But, it says, demand remained strong for all of its specialty plastics.

Demand has fallen off in a number of markets important to the chemical industry. For instance, durable goods orders and shipments have slowed in the past few months. The number of new housing starts has declined in recent months, and fewer housing starts translates into lower demand for plastics and other chemicals used in the housing industry.

The auto market was artificially buoyed at the end of the model year by intensive incentive programs such as rebates to customers. However, as these programs ran out, the new model year has not begun with any great purchasing on the part of car buyers, thus cutting demand for chemical products in this sector.

In agriculture, another big sector of the chemical industry, demand is up somewhat, but it is still growing very slowly.

The gross economic numbers for the chemical industry still look fairly good on a year-to-year basis. Production of chemicals and allied products in the third quarter rose 5% over the same period last year. And prices for the same chemical category are up almost 4% over third-quarter 1988, according to government figures.

Basic chemicals also registered advances in the third quarter, with production up about 8% and prices almost 4% over third-quarter 1988. However, compared with the second quarter, although the output of basic chemicals is up a healthy 4%, prices slipped almost 3%.

Other factors that entered into the lower earnings for the quarter, according to the companies reporting, were negative foreign currency translations, downtimes for plant maintenance, and startup costs for new plants and expansions. One factor not mentioned by these companies is that they seem to be losing some of the efficiency that was built up in the mid-1980s when they cut work forces, streamlined plants, and generally made an intensive effort to cut costs.

In recent quarters, productivity

| NINE-MONTHS 1988 | | 12-MONTH RUNNING DATA | | | |
|---|---|---|---|---|---|
| Profit margin[b] | | Change from 1988 | | Profit margin[b] | |
| 1989 | 1988 | Sales | Earnings | 1989 | 1988 |
| 8.0% | 8.6% | 9% | 4% | 8.4% | 8.8% |
| 7.2 | 7.0 | 6 | 8 | 6.8 | 6.7 |
| 16.0 | 18.4 | 14 | 7 | 16.6 | 17.5 |
| 8.7 | 16.1 | −2 | −8 | 10.8 | 11.5 |
| 10.9 | 10.8 | 16 | 19 | 10.9 | 10.7 |
| 2.3 | 3.0 | 16 | 2 | 2.9 | 3.3 |
| 4.6 | 4.8 | 30 | 10 | 4.1 | 4.8 |
| 6.8 | 6.2 | 23 | 44 | 6.4 | 5.4 |
| 15.4 | 14.3 | 10 | 27 | 15.3 | 13.3 |
| 8.8 | 9.2 | 23 | 1 | 9.4 | 11.4 |
| 1.9 | 7.7 | 41 | −42 | 2.9 | 7.0 |
| 1.9 | 3.2 | 13 | −34 | 2.1 | 3.6 |
| 17.5 | 17.9 | 17 | 18 | 17.9 | 17.8 |
| 7.8 | 9.5 | 3 | 13 | 7.9 | 7.3 |
| 2.7 | 3.2 | 11 | −12 | 2.9 | 3.7 |
| 16.2 | 18.2 | 29 | 27 | 16.8 | 17.0 |
| 4.7 | 5.3 | 10 | −21 | 4.4 | 6.2 |
| 16.8 | 16.0 | 3 | 8 | 15.9 | 15.1 |
| 7.2 | 8.9 | −8 | −24 | 7.0 | 8.4 |
| 12.7 | 10.8 | 8 | 27 | 12.3 | 10.5 |
| 8.2 | 9.4 | 12 | 15 | 8.2 | 8.0 |
| 8.8 | 8.5 | 4 | 7 | 7.4 | 7.1 |
| 11.1 | 10.6 | 9 | 16 | 11.0 | 10.4 |
| 4.9 | 4.6 | 16 | 23 | 4.5 | 4.3 |
| 4.0 | 4.8 | −5 | −27 | 3.7 | 4.8 |
| 6.7 | 12.7 | −9 | −27 | 9.0 | 11.2 |
| 7.6 | 9.7 | 6 | −12 | 7.5 | 9.1 |
| 7.9 | 8.1 | 10 | 42 | 8.5 | 6.5 |
| 15.1 | 16.5 | 0 | 0 | 15.7 | 15.7 |
| 5.3 | 5.2 | 1 | 1 | 5.1 | 5.1 |
| **9.3%** | **9.5%** | **8%** | **13%** | **9.1%** | **8.6%** |
| **10.3%** | **11.9%** | **15%** | **11%** | **12.0%** | **12.3%** |
| **9.4%** | **9.8%** | **9%** | **13%** | **9.5%** | **9.1%** |

growth in the chemical industry has been slipping and unit labor costs have been rising (C&EN, Sept. 4, page 11). In the second quarter, while these measures of productivity faltered for the chemical industry, they improved for the government's broad all-manufacturing category—a danger signal for the chemical economy. While complete figures aren't yet available, there is no indication that this situation changed in the third quarter.

Chemical companies have increased the size of their work forces considerably. The reductions in force that characterized the mid-1980s are long past. Some of this increase in hiring has been brought about, of course, by the need for more employees to handle the greater volume of production and of doing business.

However, chemical firms may well be getting "employee rich" again. According to Labor Department figures, between the end of the third quarter of 1988 and the third quarter of 1989, the chemicals and allied products industry added 21,000 employees, or about 2%, to its rolls. Industry employment has increased almost 7% since the decade-low year of 1986.

Another possible indication of the drop in productivity is the cost of selling the goods that the chemical industry makes. For a group of eight companies—American Cyanamid, Arco Chemical, Georgia Gulf, Great Lakes Chemical, Hercules, Monsanto, Olin, and Rohm & Haas—that break out such figures, the "cost of goods sold" or manufacturing costs—the largest cost component of a company's income statement— rose about 3.4% in the third quarter over the same period last year.

But an even bigger increase for these companies came in their selling, general, and administrative expense (SG&A). SG&A includes the cost of selling—advertising, salesmen's expenses and salaries, and other selling costs—and of administration of the company. This expense increased an average of 11% for the eight firms, while their sales rose an average of just 4%.

If these costs are increasing for companies throughout the industry and if demand and prices continue to falter, then earnings are going to continue to decline and they may decline rapidly.

Whatever the reasons, chemical industry earnings, while good by historic standards with most companies still potentially able to post record earnings for the year, were not good in the third quarter compared with the third quarter of last year.

Combined earnings from continuing operations, excluding significant nonrecurring and extraordinary items, for the 30 major U.S. chemical companies regularly surveyed by C&EN fell 15% in the quarter to just less than $1.60 billion. This decline came on a 3% increase in sales to $19.8 billion. As a result, the average profit margin for these companies fell to 8.1% from 9.8% in the third quarter of 1988. This is also the lowest average profit margin for the group since fourth-quarter 1987, when this profitability ratio stood at 6.9%.

The larger companies were outperformed by the smaller companies for the third quarter in all categories. Earnings for the 15 larger companies for the quarter totaled $1.33 billion, down 16% from the same period in 1988. Sales for this group increased 2% to about $17.0

## Ground rules for C&EN earnings analysis

C&EN's quarterly report on financial performance of the U.S. chemical industry contains data from the 30 largest U.S. basic chemical companies and from 23 oil and diversified companies, each with more than $200 million in annual chemical sales, plus 10 pharmaceutical companies.

To be included in the table of basic chemical producers, a company must have at least 50% of its sales in chemicals. That is why Du Pont, for example, is included in the table of diversified manufacturers.

In referring to chemical sales, C&EN means those chemicals whose molecular composition has been changed in the course of manufacture. Hence, chemical sales include those of traditional categories of basic petrochemicals and inorganics, organic intermediates and inorganic compounds, polymers such as plastics and fibers, and agricultural chemicals and specialty derivatives.

In listing earnings, the survey gives after-tax income for continuing operations before nonrecurring items and extraordinary charges. Foreign currency translations are included.

## Earnings slide at oil firms, but are mostly up at diversified and drug companies

| | THIRD-QUARTER 1989 | | | | | | NINE-MONTHS 1989 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sales ($ millions) | Earnings[a] | Change from 1988 Sales | Change from 1988 Earnings | Profit margin[b] 1989 | Profit margin[b] 1988 | Sales ($ millions) | Earnings[a] | Change from 1988 Sales | Change from 1988 Earnings | Profit margin[b] 1989 | Profit margin[b] 1988 |
| **OIL AND GAS COMPANIES** | | | | | | | | | | | | |
| American Petrofina | $ 711.9 | $ 15.1 | 2% | −57% | 2.1% | 5.1% | $ 2,278.2 | $ 105.7 | 16% | 6% | 4.6% | 5.1% |
| Amoco | 5,850.0 | 336.0 | 14 | −39 | 5.7 | 10.7 | 17,885.0 | 1291.0 | 14 | −24 | 7.2 | 10.8 |
| Ashland | 2,300.0 | 38.3 | 5 | −58 | 1.7 | 4.1 | 6,239.8 | 76.8 | 2 | −55 | 1.2 | 2.8 |
| Chevron | 8,000.0 | 417.0 | 11 | −1 | 5.2 | 5.8 | 23,900.0 | 1134.0 | 9 | −9 | 4.7 | 5.7 |
| Exxon | 23,657.0 | 1110.0 | 8 | −9 | 4.7 | 5.6 | 69,512.0 | 3420.0 | 6 | −12 | 4.9 | 5.9 |
| Kerr-McGee | 749.6 | 18.9 | 18 | −33 | 2.5 | 4.4 | 2,288.2 | 87.9 | 14 | 29 | 3.8 | 3.4 |
| Mobil | 13,636.0 | 532.0 | 4 | −4 | 3.9 | 4.2 | 41,689.0 | 1362.0 | 2 | −14 | 3.3 | 3.9 |
| Occidental Petroleum | 4,826.0 | 34.0 | −2 | −69 | 0.7 | 2.2 | 15,019.0 | 194.0 | 6 | −37 | 1.3 | 2.2 |
| Shell Oil | 5,869.0 | 340.0 | 0 | −7 | 5.8 | 6.2 | 17,729.0 | 1141.0 | 4 | 15 | 6.4 | 5.8 |
| Sun Co. | 2,730.0 | 85.0 | 11 | 18 | 3.1 | 2.9 | 8,300.0 | 271.0 | 14 | 19 | 3.3 | 3.1 |
| Texaco | 8,356.0 | 305.0 | −4 | 11 | 3.7 | 3.2 | 26,415.0 | 887.0 | −1 | 24 | 3.4 | 2.7 |
| Unocal | 2,818.0 | 79.0 | 8 | −19 | 2.8 | 3.7 | 8,532.0 | 286.0 | 14 | 28 | 3.4 | 3.0 |
| **DIVERSIFIED MANUFACTURERS** | | | | | | | | | | | | |
| Du Pont | 8,589.0 | 547.0 | 9 | 19 | 6.4 | 5.9 | 26,541.0 | 1997.0 | 10 | 18 | 7.5 | 7.0 |
| Tenneco | 3,210.0 | 90.0 | 6 | 84 | 2.8 | 1.6 | 10,194.0 | 379.0 | 6 | 115 | 3.7 | 1.8 |
| 3M | 2,994.0 | 307.0 | 5 | 4 | 10.3 | 10.3 | 9,036.0 | 952.0 | 5 | 8 | 10.5 | 10.3 |
| Allied-Signal | 2,827.0 | 121.0 | −1 | 1 | 4.3 | 4.2 | 8,884.0 | 390.0 | 0 | 6 | 4.4 | 4.1 |
| Borden | 1,962.8 | 100.9 | 5 | 10 | 5.1 | 4.9 | 5,640.5 | 243.9 | 7 | 12 | 4.3 | 4.1 |
| PPG Industries | 1,360.1 | 106.7 | 0 | −5 | 7.8 | 8.3 | 4,309.9 | 363.8 | 3 | 0 | 8.4 | 8.7 |
| FMC | 837.6 | 34.8 | 5 | 12 | 4.2 | 3.9 | 2,591.8 | 124.4 | 8 | 33 | 4.8 | 3.9 |
| Engelhard | 586.4 | 17.5 | −5 | 32 | 3.0 | 2.2 | 1,776.7 | 47.0 | 7 | 15 | 2.6 | 2.5 |
| Vulcan Materials | 307.2 | 50.5 | 3 | 2 | 16.4 | 16.5 | 818.5 | 109.7 | 4 | −1 | 13.4 | 14.1 |
| Ferro Corp. | 266.7 | 11.9 | 8 | 1 | 4.5 | 4.8 | 813.6 | 37.4 | 9 | 7 | 4.6 | 4.7 |
| NL Industries | 249.5 | 65.8 | 1 | 93 | 26.4 | 13.8 | 761.5 | 149.7 | −1 | 47 | 19.7 | 13.2 |
| **PHARMACEUTICAL COMPANIES** | | | | | | | | | | | | |
| American Home Products | 1,507.9 | 266.2 | 7 | 11 | 17.7 | 17.0 | 4,428.4 | 766.7 | 5 | 11 | 17.3 | 16.5 |
| Baxter International | 1,808.0 | 102.0 | 6 | 20 | 5.6 | 5.0 | 5,438.0 | 307.0 | 8 | 15 | 5.6 | 5.3 |
| Bristol-Myers Squibb | 2,319.6 | 410.7 | 6 | 16 | 17.7 | 16.2 | 6,828.9 | 1099.5 | 6 | 14 | 16.1 | 15.0 |
| Merck | 1,632.8 | 390.5 | 11 | 25 | 23.9 | 21.2 | 4,789.4 | 1127.5 | 9 | 25 | 23.5 | 20.4 |
| Pfizer | 1,438.5 | 217.5 | 4 | 0 | 15.1 | 15.7 | 1,508.4 | 594.0 | 0 | −9 | 39.4 | 43.3 |
| A. H. Robins | 264.3 | 12.0 | 3 | −50 | 4.5 | 9.3 | 678.4 | 31.1 | 2 | −34 | 4.6 | 7.1 |
| Rorer Group | 260.5 | 19.6 | 7 | 29 | 7.5 | 6.2 | 778.7 | 41.8 | 9 | 20 | 5.4 | 4.9 |
| Schering-Plough | 743.7 | 114.0 | 3 | 21 | 15.3 | 13.0 | 2,381.0 | 360.2 | 7 | 21 | 15.1 | 13.3 |
| Upjohn | 715.3 | 96.0 | 10 | 7 | 13.4 | 13.7 | 2,207.0 | 293.6 | 8 | 8 | 13.3 | 13.4 |
| Warner Lambert | 1,108.0 | 106.9 | 7 | 22 | 9.7 | 8.5 | 3,152.3 | 320.4 | 8 | 22 | 10.2 | 9.0 |

a After-tax earnings, excluding significant extraordinary and nonrecurring items. b After-tax earnings as a percentage of sales.

billion. As a result, profit margins averaged 7.8%, down considerably from the 9.5% average in third quarter last year.

For the 15 smaller firms, earnings fell 11% to $270 million on a sales increase of 8% to $2.82 billion. Profitability for the group slipped to 9.6% from 11.7% in the year-earlier third quarter.

For the nine months, combined earnings for the 30 companies rose 3% to $5.83 billion on an 8% sales increase to $62.0 million. Profitability slipped to 9.4% from 9.8% in the first nine months last year.

The larger firms performed better than the smaller ones in terms of profits in the first nine months. Earnings at the 15 larger firms for this period rose 4% to $4.94 billion on sales up 7% to $53.4 billion. Profitability for the group declined slightly to 9.3% compared with 9.5% in last year's first nine months.

For the 15 smaller companies, nine-month earnings fell 3% to $890 million from the same period in 1988. Sales for the firms rose 12% to $8.64 billion. As a result, however, profitability, though still higher, had a much greater fall. Profit margins for these firms dropped to 10.3% in the first nine months this year from 11.9% in the year-earlier period.

Chemical companies came in last in earnings growth compared with other industry groups surveyed by C&EN. Twelve oil companies posted an earnings decline of 13% (compared with chemical companies' 15%) to a combined $3.31 billion on

## Slipping product prices hurt chemical earnings at oil firms

Chemical earnings at major oil companies, like those at chemical firms, fell in the third quarter, but the decline was much greater for the oil producers. Combined chemical earnings for seven of these firms reporting such figures—Amoco, Chevron, Exxon, Mobil, Occidental, Shell, and Unocal—dropped 26% from the year-earlier period to $978 million. This brings the gain in chemical earnings for the first nine months of 1989 to only 4%, for a total of almost $3.60 billion.

As oil companies derive the bulk of their chemical earnings from petrochemicals, their results give a good indication of the health of the basic petrochemicals industry and the polymers business.

Practically all the oil companies complained that profit margins were sinking throughout the quarter as polymer prices fell faster than did costs of their raw materials such as ethylene and benzene. The decline in market prices for polymers was caused by an increasing weakening of demand and a subsequent building of supplies in the marketplace.

For instance, Amoco, whose chemical earnings fell 34% for the third quarter, said the decline was due primarily to shrinking commodity chemical margins as increased supply depressed prices. This was particularly true for polymers.

Mobil, which also recorded a 34% drop in earnings in the quarter, said the decline reflected lower polyethylene prices worldwide. However, Mobil pointed out that, despite the decline, earnings continued strong with good performance from ethylene glycol and the plastics fabricating business, particularly oriented polypropylene.

Occidental, with a 10% drop in chemical earnings for the quarter, stated that lower profit margins in petrochemicals were partly offset by increased volumes and margins in electrochemicals, specialty products, and agricultural chemicals.

EARNINGS ON CHEMICAL OPERATIONS

| | Third quarter | | | Nine months | | |
|---|---|---|---|---|---|---|
| $ Millions | 1989 | 1988 | % change | 1989 | 1988 | % change |
| Amoco | $120 | $181 | −34% | $402 | $539 | −25% |
| Chevron | 78 | 112 | −30 | 317 | 340 | −7 |
| Exxon | 254 | 344 | −26 | 954 | 966 | −1 |
| Mobil | 125 | 188 | −34 | 491 | 482 | 2 |
| Occidental | 254 | 283 | −10 | 842 | 622 | 35 |
| Shell | 137 | 204 | −33 | 546 | 480 | 14 |
| Unocal | 10 | 10 | 0 | 47 | 35 | 34 |
| TOTAL | $978 | $1322 | −26% | $3599 | $3464 | 4% |

billion on 5% sales growth to $79.5 billion.

A group of 11 diversified and other firms that produce chemicals recorded an earnings increase of 14% to $1.45 billion—but largely on the strength of a 93% increase at NL Industries. And 10 firms in the higher-value-added and less cyclical drug industry had an average earnings gain of 15% to $1.74 billion on sales up 6% to $11.8 billion.

So midway through the fourth quarter, the question is: Are the third-quarter results a harbinger of things to come or are they simply an indication that the industry is returning to sustainable levels?

Dow certainly holds to the latter view. Enrique C. Falla, the company's chief financial officer, says, "In 1988 and early 1989, we experienced shortage conditions and unprecedented pricing and margins, particularly in our ethylene derivatives business. As product availability has improved globally, we are returning to sustainable margins in line with long-term goals."

And at Monsanto, which was the largest of the 15 chemical companies whose earnings did not decline in the third quarter, chairman Richard J. Mahoney says, "We will set new records for sales and earnings [for the year], and make good progress toward our 20% return on equity objective." □

# Shell steps up efforts in specialty acids

Shell International Chemical Co. has launched a drive to find new applications for its $C_5$ olefin-based acids and derivatives. The company has just dedicated a $25 million specialty acids unit at Pernis, the Netherlands. The new plant, located next to the company's existing olefin acids unit, produces a range of specialty acids using the Koch process for preparing tertiary monocarboxylic acids in the presence of strong acid catalysts, under high carbon monoxide pressure and high temperatures. It is part of a major refurbishing effort to upgrade and expand the Pernis site.

Shell's existing facility produces mostly $C_9$, $C_{10}$, and $C_{11}$ acids and derivatives. However, according to Shell marketers, demand is growing for $C_5$ to $C_7$ acids, to the point that a separate unit is needed. The capacity of the new plant is about 22 million lb per year. Principal product is pivalic acid—2,2-dimethyl propanoic acid. Moreover, the company is planning a kilogram-scale experimental unit at Pernis to help with market development of new Koch acids. Feedstock is the dicyclopentadiene separated from a $C_5$ fraction at Shell's nearby Moerdijk cracker.

According to Robert Taylor, head of fine chemicals business development, most of Shell's olefin acids go to five major markets: agrochemicals, pharmaceuticals, aroma chemicals, specialty polymers, and polymer additives. The company's focus on pivalic acid is part of its philosophy for fine chemicals—to concentrate on manufacturing family trees and highly differentiated processes.

Fine chemicals are, for Shell, about a $230 million to $240 million per year business. Besides the Koch acids facilities at Pernis, the company has a variety of fine chemicals operations throughout Europe. For example, it carries out olefin cyclization and metathesis in France and it conducts phosgenation at IBIS, its joint venture with Dutch firm Gist Brocades in the U.K.

*Patricia Layman*

# Budget sequester order may nix R&D increases

If the across-the-board budget cuts imposed by President Bush in his Oct. 16 sequester order stick, a number of research agencies are going to find their 1990 budgets growing at a rate well below the 4.2% inflation rate forecast by the Office of Management & Budget—if they grow at all.

Just a few weeks ago, no one really expected the cuts to remain in effect for long (C&EN, Oct. 23, page 5). But Congressional efforts to work out a final version of a reconciliation bill that will raise enough revenue and cut enough federal spending to meet the Gramm-Rudman-Hollings deficit reduction target of $100 billion—give or take $10 billion—for 1990, are proceeding at a snail's pace. Bush has indicated that he'd rather live with sequestered budgets than sign a reconciliation bill that doesn't produce "a real deficit reduction—without new taxes, without spending measures that increase the deficit in the future, and without scoring gimmicks."

One way to accomplish this would be for Congress to omit from the final reconciliation bill a provision canceling the Oct. 16 order. That provision cut civilian research budgets 5.3% and defense R&D 4.3% below the level of funding they had when the order went into effect. The whole federal government, with one exception, at that time was operating under a continuing resolution that essentially just extended the agencies' fiscal 1989 funding.

If on Oct. 16, according to an example provided by OMB to explain how the sequester order works, an agency's budget was $100,000, that agency would multiply that number by 0.053, and subtract the result

## Across-the-board cuts could stagnate many R&D budgets

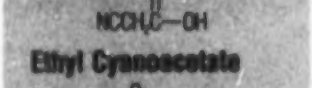
| $ Millions | 1990 Appropriation Pre-sequester | 1990 Appropriation Post-sequester | 1989 | % change 1989–90 Pre-sequester | % change 1989–90 Post-sequester |
|---|---|---|---|---|---|
| **NIH** | **$ 7,636.0** | **$ 7,239.8** | **$ 7,171.5** | **6%** | **1%** |
| Cancer | 1,664.0 | 1,577.6 | 1,570.9 | 6 | 0 |
| Heart, Lung & Blood | 1,091.3 | 1,033.9 | 1,045.7 | 4 | −1 |
| Allergy & Infectious Diseases | 846.3 | 805.5 | 742.3 | 14 | 9 |
| General Medical Sciences | 691.9 | 654.4 | 682.2 | 1 | −4 |
| Diabetes, Digestive & Kidney Diseases | 591.9 | 561.1 | 559.6 | 6 | 0 |
| Neurological Disorders & Stroke | 497.1 | 470.7 | 472.3 | 5 | 0 |
| Child Health & Human Development | 450.6 | 427.2 | 425.5 | 5 | 0 |
| Research Resources | 354.2 | 334.6 | 358.3 | −1 | −7 |
| Aging | 243.5 | 231.2 | 222.8 | 9 | 4 |
| Eye | 241.2 | 228.5 | 231.3 | 4 | −1 |
| Environmental Health Sciences | 233.3 | 221.0 | 223.7 | 4 | −1 |
| Arthritis & Musculoskeletal & Skin Diseases | 171.7 | 162.9 | 160.0 | 7 | 2 |
| Dental Research | 138.1 | 130.9 | 130.8 | 6 | 0 |
| Deafness & Other Communication Disorders | 119.0 | 114.3 | 94.8 | 25 | 20 |
| Center for Human Genome Research | 60.0 | 56.8 | 27.6 | 117 | 106 |
| Other | 241.9 | 229.2 | 224.2 | 6 | 2 |
| **NASA R&D** | **5,281.8** | **5,050.5** | **4,166.7** | **27** | **21** |
| **Energy** | **5,266.7** | **5,005.7** | **4,842.5** | **8** | **3** |
| **Energy supply R&D** | 2,215.5 | 2,098.1 | 2,142.3 | 3 | 2 |
| Supporting research and technical analysis | 680.8 | 644.7 | 642.2 | 6 | 0 |
| Nuclear activities | 590.3 | 558.6 | 610.5 | −3 | −8 |
| Magnetic fusion | 326.6 | 310.2 | 351.5 | −7 | −12 |
| Other | 616.8 | 584.6 | 538.1 | 15 | 9 |
| **Weapons R&D** | 1,351.3 | 1,293.2 | 1,279.7 | 6 | 1 |
| **General science and research** | 1,114.4 | 1,055.3 | 922.1 | 21 | 14 |
| **Fossil R&D** | 422.1 | 401.2 | 380.6 | 11 | 5 |
| **Conservation R&D** | 163.4 | 157.9 | 117.8 | 39 | 34 |
| **NSF** | **2,068.5** | **1,961.8** | **1,886.7** | **10** | **4** |
| Research and related activities | 1,688.4 | 1,599.4 | 1,584.7 | 7 | 1 |
| Science education activities | 206.7 | 197.3 | 171.0 | 21 | 15 |
| Antarctic programs | 153.7 | 146.5 | 131.0 | 17 | 12 |
| Academic facilities | 9.7 | 18.6 | na | | |
| **EPA R&D** | **429.0** | **407.4** | **386.5** | **11** | **5** |
| **Commerce** | **422.3** | **398.6** | **425.0** | **−1** | **−6** |
| Oceanic and atmospheric research | 172.8 | 163.8 | 157.0 | 10 | 4 |
| NIST | 163.6 | 154.9 | 159.0 | 3 | −3 |
| PTO | 85.9 | 79.9 | 109.0 | −21 | −27 |
| **TOTAL** | **$21,104.3** | **$20,063.8** | **$18,878.9** | **12%** | **6%** |

**Note:** All numbers are estimates. na = not available

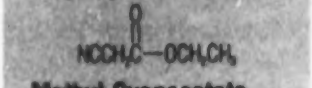

Cyanoacetic Acid and Esters

Cyanoacetic Acid

Ethyl Cyanoacetate



Methyl Cyanoacetate



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($5300) for a budget of $94,700. That was the only calculation necessary for an agency whose fiscal 1990 appropriation bill had been enacted by Oct. 16. However, if after Oct. 16 Congress appropriated $150,000 for the agency, it had to subtract only the $5300—not a newly calculated $7950—from $150,000 for a fiscal 1990 budget of $144,700.

The one appropriation bill enacted before Oct. 16 provided funding for, among other things, the Department of Energy's research programs. Congress appropriated $590.8 million for basic energy sciences, 7% above the 1989 funding level and just slightly over the budget request. However, the sequester order reduces the fiscal 1990 budget to $559.5 million, just 1% higher than in 1989.

Funding for chemical sciences is similarly hard hit. The Administration had requested a 9% increase to $147.9 million for chemical sciences. Congress approved an 8% increase. But the sequester order leaves that account with a 2.5% increase to $138.5 million. Funding for materials sciences, on the other hand, will still be up 8% to $195.2 million, even after sequester. The Administration had requested a 12% increase to $202 million; Congress approved a 14% increase to $206 million. Congress also provided $220.8 million for the Superconducting Super Collider, including $25 million to initiate construction of the first tunnel sector. After sequester, the SSC will get $209 million.

After a lot of maneuvering the National Science Foundation emerged from the conference committee on the VA-HUD-Independent Agencies Appropriation bill with a budget increase of 8% to $2.1 billion. As a result of the efforts of three conference committee members—Sen. Jake Garn (R.-Utah), Rep. Bob Traxler (D.-Mich.), and Rep. Bill Green (R.-N.Y.)—the conferees decided to fund NSF's research programs at a level of $1.715 billion, $30 million above the recommended Senate level and 8% over fiscal 1989. They found the money for the increase by making a 0.1% reduction in all the other discretionary accounts contained in the bill.

However, what Congress gives, it can also take away. As the conferees were winding up their work they discovered that the total funding provided in the bill exceeded the budget ceiling for those programs. So they cut all the programs funded in the bill by 1.55%, leaving NSF with a research program budget of $1.688 billion, an increase of 6.5%. The sequester order requires NSF to reduce its research budget by just under $90 million, leaving it with a bare 1% increase for fiscal 1990. This translates to 700 fewer grants than would have been awarded before the sequester.

One bit of good news is that for the first time the fiscal 1990 budget provides money for the long-planned


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